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Love and Anger in Global Party Politics: Facebook Reactions to Political Party Posts in 79 Democracies

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The reactions feature of Facebook provides an opportunity to explore emotional responses to political messages across the globe on a common platform. In this article, we describe this new measure and present a dataset of over two million posts from the Facebook pages of 690 political parties in 79 democracies. We study Love and Angry reactions to these posts, their potential use as measures of emotional response, and party-level variation in the frequency of these reactions. We find that parties receive systematically different proportions of Love and Angry reactions depending on their ideology, party family, and populist orientation. More extreme parties tend to elicit relatively greater emotional responses. Nationalist, populist, and right-leaning parties in particular elicit a higher proportion of Angry reactions and emotional polarization.

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Emotions matter for political judgment and behavior (e.g., Brader, 2006; Brader et al., 2008; Marcus et al., 2000; Marx, 2020; Webster, 2020). Anger, for instance, has been shown to promote information seeking (e.g., Hoewe and Parrott, 2019) and political participation (e.g., Ford et al., 2019; Valentino et al., 2011). Similar findings have been reported for positive emotions such as enthusiasm (e.g., Jones et al., 2013). Previous studies have also shown that parties strategically alter their communication strategies with a goal of eliciting specific emotional responses from supporters and undecided voters (e.g., Crabtree et al., 2020; Jung, 2020). In short, emotions are central to politics and there is an increasing recognition that they play an important role in party politics as well.

However, gauging emotional responses to messages from specific parties over time and on a global scale is not an easy task. Existing research has studied emotions in politics in two different ways: (1) using textual data from a variety of sources, including party manifestos (e.g., Crabtree et al., 2020), legislative speech (Valentim and Widmann, 2020, e.g.,), social media (e.g., Jones et al., 2013), or other sources (Kosmidis et al., 2019) to gauge parties' intentions to target specific emotions; and (2) relying on survey data — observational or experimental — to explore the self-reported emotional responses of voters and partisans (e.g., Jones et al., 2013; Roche and Jacobson, 2019; Webster, 2020). Neither of these approaches is ideal. Relying on textual data to differentiate the emotional appeals of party elites remains challenging methodologically because the currently available tools for analyzing unstructured texts in multiple languages on a common emotional metric remain limited (Lucas et al., 2015). Likewise, existing survey data includes no widely available items for measuring emotional responses to specific parties cross-nationally. As a consequence, nearly all studies of emotional responses to politics focus on a handful of countries (e.g., Crabtree et al., 2020) or even just one (e.g., Vasilopoulos et al., 2019).

One potential path forward is to focus not on the textual content of social media, but rather on the meta-data associated with each post. A significant amount of previous scholarly attention has focused on 'engagements' such as amplifying (e.g., retweets), interacting with (e.g., comments), or signaling approval for (e.g., likes) social media posts (e.g., Messing and Westwood, 2014).[1] While imperfect reflections of reality, scholars have

[1]These same sets of actions go by different names on different platforms.

effectively employed user engagements to study elites and the public. For instance, Bond and Messing (2015) use 'Likes' on Facebook to measure ideology of US political candidates and voters, and Barberá (2015) pursues a similar strategy based on interactions on Twitter. Nulty et al. (2016) uses text from re-tweets and mentions of candidates on Twitter to analyze the dimensions of conflict in the 2014 European Parliamentary election.[2]

We propose that a specific form of metadata associated with Facebook posts — 'reactions' — can be used to study mass emotions, and that this new measure avoids challenges posed by text and survey measures. These 'reactions' were introduced to all Facebook users worldwide in February 2016 to supplement the standard 'Like' button. Reaction options are available to users as part of the standard display, appearing as options when users hover over or 'deep press' the Like button. Reactions from other users to a post also appear directly below posts as part of the standard metadata display shown to users looking at a post.

In the four years since, the 'Love,' 'Haha,' 'Wow,' 'Sad' and 'Angry' reactions have become a standard feature of the platform globally.[3] The Haha and Wow reactions are both often used ironically, making their interpretation unclear, while the Sad reaction is simply not used as often. For these reasons, our analysis focuses primarily on Angry and Love. These reactions have at least two advantages for the study of emotions. First, they convey a clear emotional connotation about how Facebook users respond to specific pieces of content. Indeed, Eberl et al. (2020) show that these reactions are correlated as expected with the sentiment expressed in post texts, which differs from the much more ambiguous Like reactions (Gerlitz and Helmond, 2013). Like reactions are a signal of support for a post, but can convey wildly different emotions depending on the specific content. Second,

[2]Moreover, in recent years, scholars and political elites alike have increasingly recognized that online engagement itself is an important mode of political participation in the pursuit of political goals (Jackson et al., 2020). These can lead to social endorsements form peers (Anspach, 2017; Messing and Westwood, 2014) or algorithmic amplification (i.e., more reactions lead to higher position on the news feeds) (Bucher, 2012). Indeed, fostering online engagement from supporters is now a major priority for many campaigns (Gibson, 2015). In the US setting, national campaigns regularly employ social media teams and candidates themselves offer 'selfy' lines (in part) to promote online activism from supporters (Jennings, 2019).

[3]Facebook added a new 'Care' reaction in March 2020. Also it periodically tested other custom reactions, such as the 'Rainbow flag' reaction, which are unfortunately not accessible via the crowdTangle API (CrowdTangle Team, 2020).

emotional reactions are universally available and can be directly associated with specific parties on a standard metric across the globe (Jacobs et al., 2020; Wirz et al., 2018).

To illustrate the utility of this novel measure, we describe a newly assembled dataset of over two million posts from the Facebook pages of 690 political parties in 79 democracies and provide three case studies from Brazil, Poland, and the United States, each illustrating that, at least in some cases, reactions on Facebook correspond with expected emotional responses to real-world political dynamics surrounding respective parties. We then provide basic descriptive statistics about Angry and Love reactions to political posts, documenting how they differ across the globe.

We further leverage the data to study whether certain types of parties are associated with more positive and negative emotions. This question stems from prior work suggesting that right-wing nationalist parties are associated with specific emotional responses from many voters (e.g., Heiss and Matthes, 2020; Matamoros Fernandez, 2018; Marx, 2020). Vasilopoulos et al. (2019), for example, argues that parties such as France's Front National are associated with fear and anger. However, it is unclear if emotions are a cause, effect (Wirz et al., 2018), or strategic tool (Scheller, 2019) of right-wing parties. Following from the latter, it is possible that the populist rhetoric of these parties triggers strong emotional responses (e.g., Blassnig and Wirz, 2019). After all, studies suggest that populist parties engage in stronger emotional appeals, especially towards negative emotions like anger and fear (Jacobs et al., 2020; Jost et al., 2020; Widmann, 2019). Drawing on party manifesto data, Crabtree et al. (2020), in turn, argue that emotional appeals may be a function of party ideology more generally, with moderate parties employing higher levels of positive rhetoric relative to extremist parties. This suggests that the rhetoric of not just far right but also far left parties (e.g., communists) may elicit more negative emotions from voters. We will explore this and other possible patterns between party ideology and emotional reactions by documenting systematic variation in these reactions as a function of party family, ideology, and populist orientation. We find that more extreme parties tend to elicit higher proportions of emotional responses (both for Love and Angry responses). Further, nationalist and populist parties receive proportionally far more Angry responses while left-wing parties tend towards more emotional balance.

Throughout our presentation, we note that these findings are descriptive, but suggest paths forward for future research. As with all cross-national studies, there are many potential lurking confounders that prevent us from making strong causal claims and we take no steps to resolve this underlying issue here. For example, it is unclear if it is the rhetoric of right wing parties that elicits angry reactions or if it is the existence of angry voter coalitions that fosters the rise of right-wing rhetoric online. Nonetheless, we believe that this is the most comprehensive comparative study of engagements with social media posts from political elites to date and that our results suggest that analyzing reactions will provide a path forward for the cross-national study of emotions in politics.

The Comparative Party Social Media Dataset

To construct our novel cross-national dataset of Facebook posts by political parties, we analyze the public Facebook pages of parties in 79 democracies using the CrowdTangle API provided by Facebook (CrowdTangle Team, 2020). The selected countries meet at least one of the following criteria: (1) a democratic country[4] included in the Comparative Manifesto Project (CMP; Volkens et al., 2020), or (2) a democratic country with a population of more than 2 million and greater than 20% Facebook penetration.[5] The first criterion allowed us to include most advanced democracies (mainly in Europe), and the second criterion extended the dataset by adding other relatively young democracies with sufficient Facebook usage while excluding microstates.

For each country, we included all parties and electoral coalitions that in lower house elections since 2016 received at least either (1) 3% of the popular vote, or (2) 1% of the seats.[6] These criteria reasonably excluded extra-parliamentary parties and tiny parties in large legislatures while at the same time achieved a fairly wide coverage of parties across the globe. In all, we identified 772 parties or electoral coalitions that satisfied the above criteria.

[4]We used the average Polity scores (Marshall and Gurr, 2020) between 2016 and 2018 and considered a country as a democracy if its mean score was above 5.5.

[5]The data on Facebook penetration is based on the Internet World Stats (see https://www.internetworldstats.com/stats2.htm). Most major democracies are included in the final list with the notable exception several large democracies in South Asia and Africa.

[6]Some countries had more than one election between 2016 and 2020, and we considered on all of them. For Kyrgyzstan and Myanmar, we relied on their latest, 2015 election results.

After creating the list of parties and coalitions, the next task was to identify their official Facebook page. We first checked their websites to obtain links to their Facebook pages when available. If Facebook accounts were not linked on their websites, we did several generic searches until we were able to locate their accounts. We found several instances in which parties switched their accounts from one to another, and we included both old and new accounts in our data set. Further, we found that some parties set up separate Facebook accounts in different languages. For example, some Estonian parties have both Estonian and Russian accounts, whereas some parties in Malaysia have Chinese and Malay accounts. To find these sub-language pages, we conducted additional searches in the country's official languages and all languages used on the websites of parties in the country.[7] In total, we found the Facebook accounts for 93% of the parties and coalitions in our list, bringing the final count of parties/coalitions to 716. Note, however, that many electoral coalitions lack formal institutional structures; excluding them brings the data coverage up to 97%.

In the analysis that follows, we focus on a period between March 1st, 2016 and February 29th, 2020. This starting point corresponds with the introduction of Facebook's reactions feature in the late February of 2016. We do not analyze data after March 2020 for two reasons. First, Facebook added a new reaction, Care, in March 2020, which changes how we can interpret the proportions of Love and Angry over all reactions. Second, it is possible that the outbreak of the global pandemic has changed the ways in which people react on parties' Facebook pages, and reactions before and during the COVID-19 pandemic may not be directly comparable.

After downloading posts on parties' Facebook accounts through the CrowdTangle API and deleting all duplicate entries, we got 2,146,078 posts of 746 pages among 690 parties and coalitions. The number of parties in this analysis became slightly smaller than above because some party accounts had no post in our time range and we removed 14 accounts that showed very low engagement since it seemed likely they were not legitimate.[8] Table 1 shows the descriptive statistics of all engagements on parties' Facebook pages — comments,

[7]Some Tunisian parties have separate accounts for diasporas in France. We considered them as sub-language pages and included them in our dataset.

[8]See Appendix A for the list of excluded parties. Appendix B summarizes the number of party accounts and posts by country.

Table 1: The Descriptive Summary of Reactions on Party Facebook Pages, March 2016–February 2020.

	Mean	SD	Max
# Comments	64.75	420.17	139,399
# Shares	111.40	1,139.73	567,596
# Total Reactions	379.27	1,391.78	316,043
# Likes	323.89	1,177.22	254,057
# Love	21.64	167.71	56,028
# Angry	17.13	143.89	25,866
# Wow	2.05	15.09	6,079
# Haha	10.29	135.35	61,911
# Sad	4.27	49.63	19,335
Like Proportion	0.89	0.17	1
Love Proportion	0.04	0.06	1
Angry Proportion	0.03	0.08	1
Wow Proportion	0.01	0.02	1
Haha Proportion	0.02	0.06	1
Sad Proportion	0.01	0.04	1
Emotional Polarization	0.99	0.10	2

Note. N = 2,146,078. # Total Reactions is the sum of Likes, Love, Angry, Wow, Haha, and Sad.

shares, and reactions. Although Like is the most used reaction, as previously explained, our main focus is on two reactions that clearly convey a precise emotional reaction from users: Love and Angry. As Table 1 shows, these are also the next most used reactions after Like.

In the following analyses, we use three measures of emotional reactions. The first two are the proportions of Love and Angry reactions.[9] These measures are calculated as the raw counts of Love and Angry divided by the sum of all reactions (Likes, Love, Angry, Wow, Haha, and Sad). For example, if a post received 10 Likes, 2 Love, 4 Angry, 1 Wow, 1 Haha, and 2 Sad, the proportion of Love is $2/20 = 0.1$ whereas the proportion of Angry is $4/20 = 0.2$. As shown in Table 1, the average proportion of Love is 0.04 with a standard deviation of 0.06, while the average proportion of Angry is 0.03 with a standard deviation

[9]We do not call the latter 'the proportion of anger' because we are not measuring anger per se.

of 0.08. Our last measure is emotional polarization, which unifies the first two measures and creates a single indicator of a relative share of Angry reactions over Love reactions in each post. It is calculated as:

$$Emotional\ Polarization = \frac{Angry\ Proportion + 1}{Love\ Proportion + 1} \tag{1}$$

Emotional polarization smaller than 1 indicates that Love reactions are more prevalent than Angry reactions, whereas emotional polarization greater than 1 means the opposite.

Before turning to our results, it is worth emphasizing that care should be taken as to how these measures are interpreted. The variables of interest here are the proportion of reactions that are Angry or Love. This does not take into account the intensity of the aggregate emotional response. Thus, by our measure, having six out of ten Angry responses is equivalent to 6,000 out of 10,000. We choose this strategy because modeling the raw number of reactions itself conflates the raw number of responses with the emotional tone of responses. A post might receive more Angry responses simply because it receives more engagements[10] or was posted on a more popular page.[11] Thus, while we still believe that these proportions are the most informative way to examine these data, we try to be careful in our interpretations below.

How Facebook Reactions Reflect Emotional Responses

In this section, we demonstrate that the proportions of Love and Angry on parties' Facebook pages are meaningful indicators of emotional attachment and responses, all of which are summarized by Figure 1. To do so, we conduct a series of case studies, each demonstrating that reactions on Facebook reflect emotional responses to real-world political

[10] We show in Appendix C that posts that receive a larger number of reactions generally also tend to receive a more diverse set of reactions.

[11] An alternative strategy would be to use some measure of exposure (e.g., impressions) as the denominator. We approximate this strategy in Appendix F, where we replicate our main findings using the number of Likes received by the Facebook page as a proxy for a party's popularity/influence on social media. We show that our results hold (with some exceptions). However, this approach is also problematic in that the incentives that lead individuals to Like the *page* of a party are probably very different than the factors that lead individuals to react to a post. For instance, someone may regularly give an Angry response to the posts of a party they do not in any way support.

dynamics surrounding political parties and candidates. This can happen either because of the content parties have posted on Facebook or because people visit the Facebook pages of parties that are the center of major events and leave their reactions, no matter the content of the post. To illustrate, we now summarize three case studies drawn from three continents, acknowledging that further validation is needed to generalize more broadly.

Our first case study comes from the impeachment of President Dilma Rousseff in Brazil. In early 2016, she was accused of trying to plug deficit holes in popular social programs to boost her chances of reelection in October 2014. According to Brazil's fiscal laws, moving funds between government budgets was illegal. The misconduct triggered mass demonstrations across Brazilian cities demanding her resignation. Her impeachment trial officially started in May 2016, when Rousseff's powers as President were suspended. Then, on August 31st, 2016, the Senate ousted Rousseff in an impeachment vote.

We examine users' reactions on the Facebook page of the largest opposition, the Brazilian Social Democratic Party (PSDB). In panel A of Figure 1, we analyze the daily average proportions of Love and Angry, which are simply the mean proportions of these two reactions on all posts in the same day, on the PSDB's page between August 16th, 2016 and September 15th, 2016. This panel shows that the average proportion of Love reactions spiked on August 31st (indicated by the vertical dashed line), when the Senate removed President Rousseff. The post that received the highest proportion of Love reactions on that day reads as follows: "WE TURN THE PAGE! Senator Aécio Neves, PSDB's national president, echoes Dilma's definitive removal and the senators' decision to maintain the PT's political rights."[12] We interpret this as an example of people using the Love reaction to express positive emotions in response to a post with which they agree and a corresponding real-world event, which brings them satisfaction and joy. Such use of the Love reaction is in line with our expectations about how opposition supporters are likely to emotionally respond to presidential impeachment.

Our second example concerns a new abortion ruling in Poland. On October 22nd, 2020, Poland's Constitutional Court ruled that abortion due to a child's fetal defects is

[12]https://www.facebook.com/PSDBoficial/posts/1132922843453590.

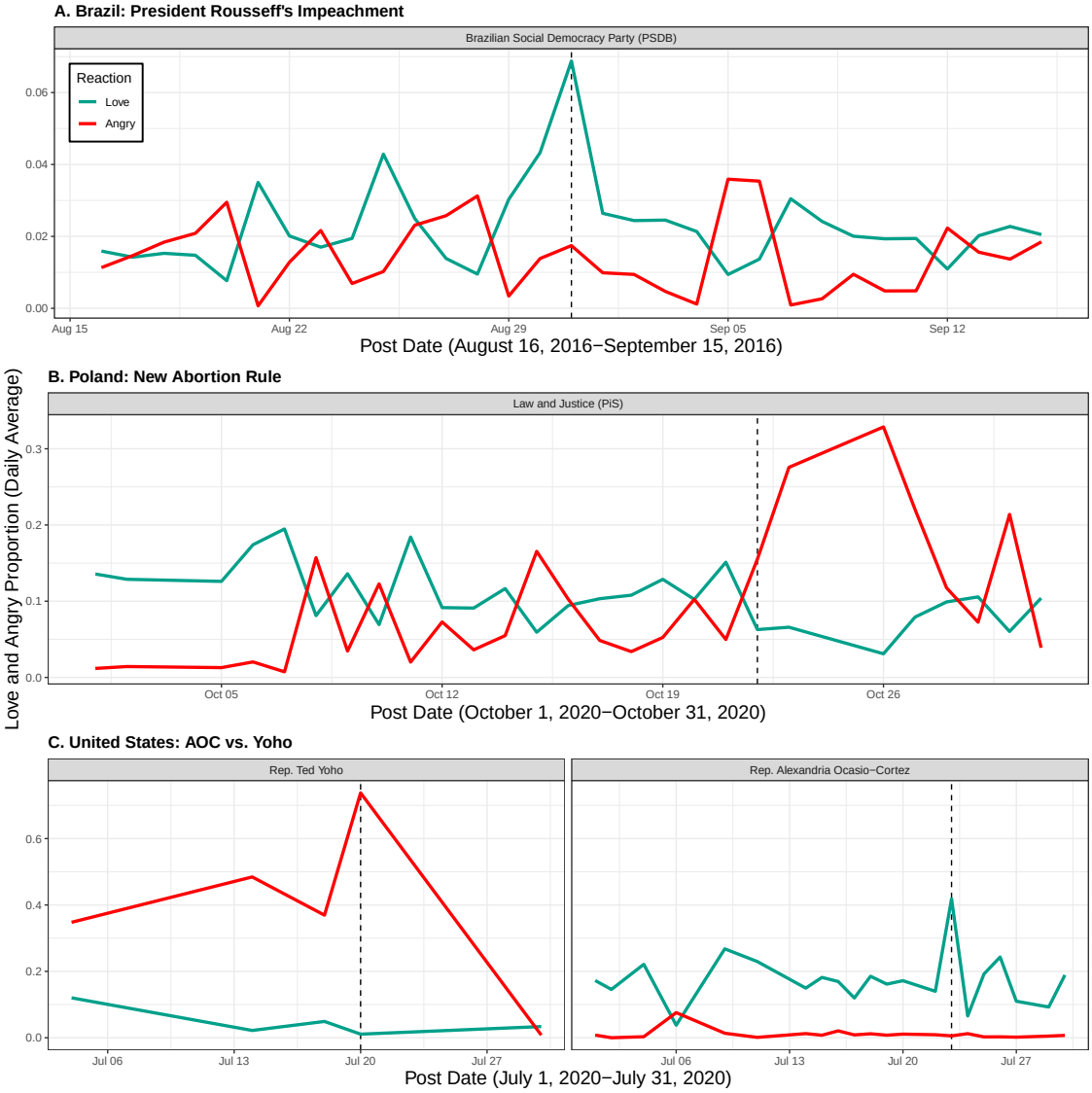

Figure 1. Three Examples of Real-World Events and Emotional Reactions.

Note. The figure shows the daily average proportions of Love and Angry on the Facebook pages of the Brazilian Social Democratic Party (PSDB), the Law and Justice (PiS), and Representatives Ted Yoho and Alexandria Ocasio-Cortez. Vertical dashed lines indicate the days of critical events, which are August 31st, 2016 in Brazil, October 22nd, 2020 in Poland, and July 20th and 23rd, 2020 in the United States.

unconstitutional.[13] If this rule becomes law, abortion will be legal only in cases of rape and incest, or when the mother's life or health is at risk. The new ruling received a major international backlash[14] and was followed by massive domestic protests. The criticism was particularly targeted toward the right-wing governing party, Law and Justice (PiS), which has been promoting the tightening of abortion-related legislation.

In panel B of Figure 1, we examine how this event was reflected on the PiS's Facebook page in October 2020. After the court ruling on October 22nd (indicated by the vertical dashed line), the party's page experienced a large increase in the daily average proportion of Angry. For example, the post that received the highest proportion of Angry reactions was from October 27th,[15] in which the PiS leader Jaroslaw Kaczyński expressed his support for the court order and criticized protests during the COVID crisis. He also blamed people attacking the Roman Catholic Church, claiming that the new abortion rule was the only way to defend Poland from moral decay. The proportion of Angry reactions on this post was 0.705, which was 6.7 times greater than the average proportion of Angry reactions that the PiS's other posts received on the same month. This example shows how people use the Angry reaction to express the corresponding emotion — anger — toward a governing party.

As the last example, we analyze Facebook reactions to the fight between the U.S. House Representatives Alexandria Ocasio-Cortez and Ted Yoho in July 2020. Although individual politicians are not in our data, this particular case provides another interesting example for understanding how people use the Love and Angry reactions. The event started on July 20th, when Yoho reportedly called Ocasio-Cortez a 'f*cking b*tch' on the steps of the Capitol. This incident quickly became viral, highlighting sexism in Congress. Ocasio-Cortez then responded to Yoho's insult in her congressional speech on July 23rd, which was

[13]This and the next example focus on events that happened after the introduction of the Care reaction in March 2020. To be consistent with the rest of the analyses, we ignored the number of Care reactions when we computed the denominator.

[14]For example, Dunja Mijatovic, the Commissioner for Human Rights at the Council of Europe, tweeted "Removing the basis for almost all legal abortions in #Poland amounts to a ban & violates #HumanRights. Today's ruling of the Constitutional Court means underground/abroad abortions for those who can afford & even greater ordeal for all others. A sad day for #WomensRights." (see https://twitter.com/CommissionerHR/status/1319273573240893452).

[15]https://www.facebook.com/pisorgpl/posts/10157373594992132.

highly praised by mainstream media.

In panel C of Figure 1, we compare the daily average proportions of Love and Angry on the two representatives' Facebook pages in July 2020. In the left-bottom panel, we find that Yoho's page scored the highest proportion of Angry on July 20th. But we also see that his posts tended to get relatively high proportions of Angry reactions even before July 20th: while he did not post anything directly related to his sexist remark, people still expressed their anger in response to all of his posts in July 2020. For example, a seemingly innocuous post about the Independence Day stating, "Today we celebrate the birth of our great nation & give thanks for the freedoms we enjoy every day. May God bless America & all who defend her." nonetheless received a large volume of angry reactions and comments.[16] This demonstrates that Facebook users express their emotions on politicians' Facebook pages in response to real-world political dynamics involving this politician even when politicians' own posts lack emotional content.

The right-bottom panel of Figure 1, by contrast, shows the daily average proportions of Love and Angry on Ocasio-Cortez's page in July 2020. We see that the average proportion of Love spiked on July 23rd, and the post that received the highest proportion of Love was indeed a video of her speech.[17] This post got a 2.8 times greater proportion of Love reactions than her other posts in the same month. We see this as an expression of cheerleading and emotional support for Ocasio-Cortez.

In general, the above examples provide evidence, albeit limited, that Facebook reactions provide an opportunity to recover peoples' emotional responses to real-world political dynamics in a predictable manner. However, these examples also serve as a launching point for thinking more carefully about how these reactions relate to both public attitudes and political events.

To begin, there is no reason to believe that reactions to Facebook posts are representative of public opinion or emotions writ large. Yet, it is not the case that reactions to posts are limited to partisan supporters. In some cases, responses seem to come from

[16]https://www.facebook.com/CongressmanTedYoho/posts/4730213900337884.
[17]https://www.facebook.com/repAOC/posts/775146519900552.

co-partisans. Thus, the Love reactions for PSDB spiked in 2016 although presumably partisans of the just-impeached president did not support the outcome. On the other hand, as the examples from Poland and Ted Yoho illustrate, in some cases responses seem to be driven by the reactions of political opponents or at least non-supporters. In some ways this is promising because it means that reactions tap into the emotional responses of a broader set of citizens than just co-partisans. But in other ways it makes the interpretation more difficult because it is not immediately clear who the set of respondents reacting to any particular post may be. Indeed, in theory responses may also reflect the emotional responses of individuals in different locations (e.g., international audiences) and different times (e.g., individuals adding reactions to posts posted days or even years in the past).

In many cases the content of the post seems to be a driving factor with, for instance, angry rhetoric garnering Angry reactions (Eberl et al., 2020). However, these examples also show that reactions on Facebook may reflect not just the content of a post but also the users' sentiment toward a party at a given moment. This means that if researchers only focus on post content — for example, using a dictionary-based approach — and ignore the broader real-world dynamics at play, they may misconstrue the emotional appeal of a post. In other cases in our data, seemingly innocuous language (e.g., announcing rallies or events) can garner significant proportions of emotional reactions that simply cannot be explained by the text alone.

In general, these reactions are best conceptualized as a measure of the emotional reactions that a party's posts received online. Reactions do seem to be associated in meaningful ways with real-world events and post content implying they may be imperfectly correlated with other concepts such as public emotions, the emotional response of co-partisan supporters, and the words and images in the the post itself. Still, that is not the same as saying that reactions are surrogates for these other concepts – a claim that would require additional empirical support. In our view, the responses that political parties receive online are interesting and relevant in and of themselves given the rising importance of online political discourse across the world. However, we should be careful about assigning additional meaning to these metrics without further investigation.

Country-Level Variation

Next, we briefly explore the proportions of Love and Angry reactions cross-nationally. Figure C1 shows each country in our dataset ranked by the average proportion of Love and Angry reactions. Similarly, Figure 3 ranks democratic countries by emotional polarization.[18] The same data is mapped geographically in Figures 4.

One can see immediately that there is considerable variation in the use of emotional reactions across the globe, although there are no obvious and consistent patterns. For instance, the high proportion of Angry reactions in highly polarized countries like Belgium, Hungary, and the United States makes some intuitive sense. However, this is inconsistent with the low use of Angry reactions in strongly divided (and even unstable) democracies such as Iraq, Myanmar, or Tunisia. Similar inconsistencies appear in the high proportion of Love reactions where both functional political systems (e.g., Estonia) and systems characterized by high levels of conflict and instability (e.g., Italy and Lebanon) can exhibit similar aggregate patterns.

In terms of emotional polarization, we observe that for a vast majority of countries (N = 57), Love reactions tend to dominate Angry reactions as indicated by the fact that emotional polarization is smaller than 1. By contrast, Angry reactions are relatively more prevalent than Love reactions in 22 countries; 17 of these countries are located in Europe, and the remaining countries include Australia, Canada, Lebanon, Taiwan, and the United States.

These descriptive results indicate that there may be cultural differences in how reactions are used and interpreted across the world. However, there is no clear pattern across their use. Country-level correlation between the proportions of Love and Angry is 0.26. However, within each country the post-level correlation between the proportions of Love and Angry reactions ranges from 0.12 in Nepal to -0.56 in the United States, with most countries showing modestly negative correlations of between 0 and -0.20 (see Appendix D).

[18] In Appendix C, we also rank countries by the average number of reactions and the proportion of Likes. There is some cross-national variation in user engagement and the use of emotional reactions other than Likes.

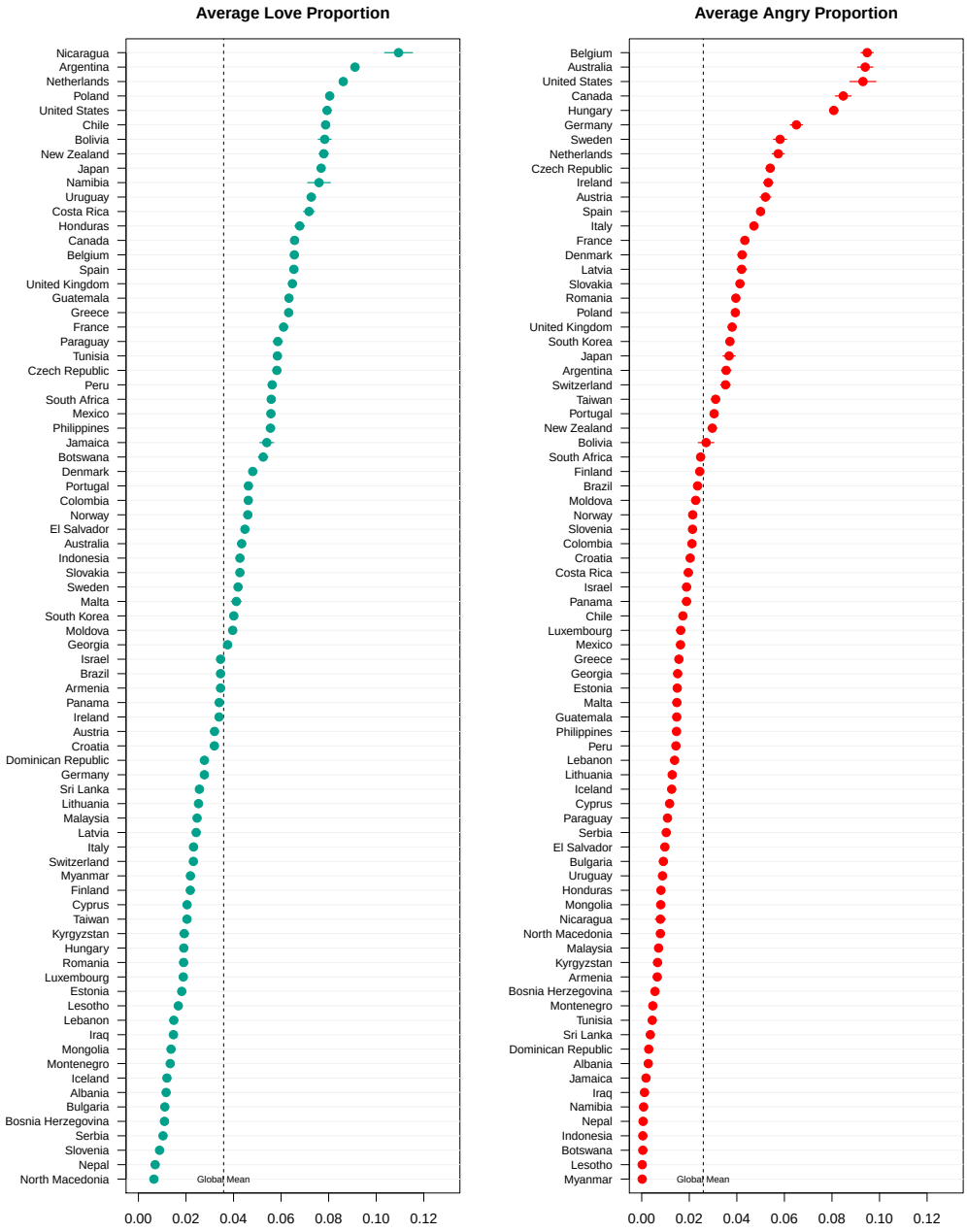

Figure 2. Democratic Countries Ranked by Average Love and Angry Proportions.

Note. The figure ranks democratic countries by the average proportions of Love and Angry that party posts receive. Horizontal bars indicate 99% confidence intervals. The country-level correlation between Love and Angry proportions is 0.26.

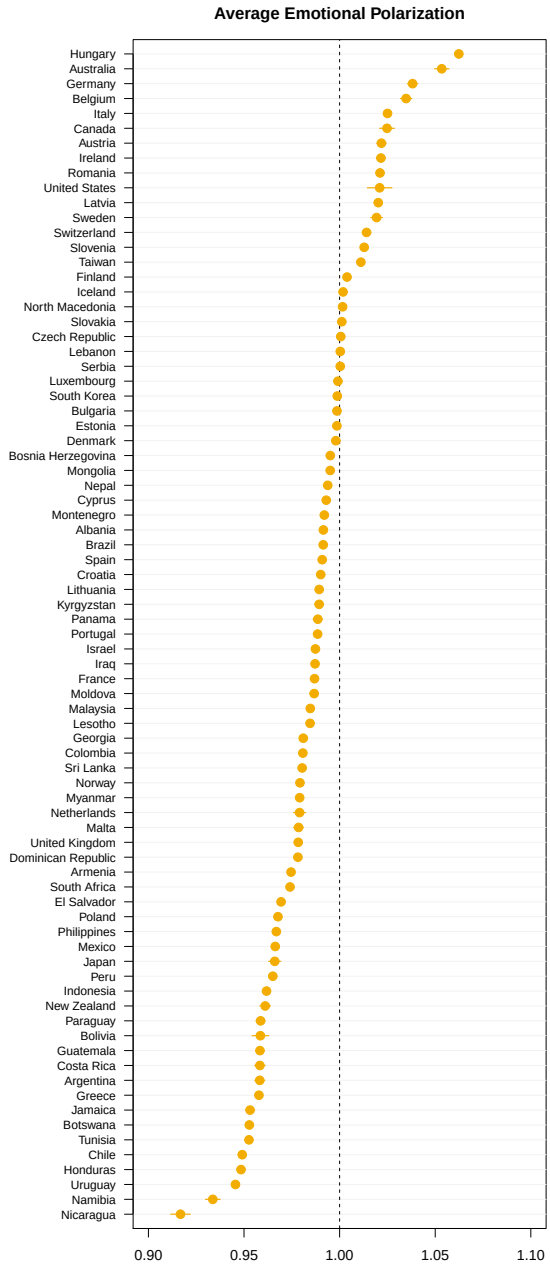

Figure 3. Democratic Countries Ranked by Emotional Polarization.

Note. The figure ranks democratic countries by the average emotional polarization. Horizontal bars indicate 99% confidence intervals.

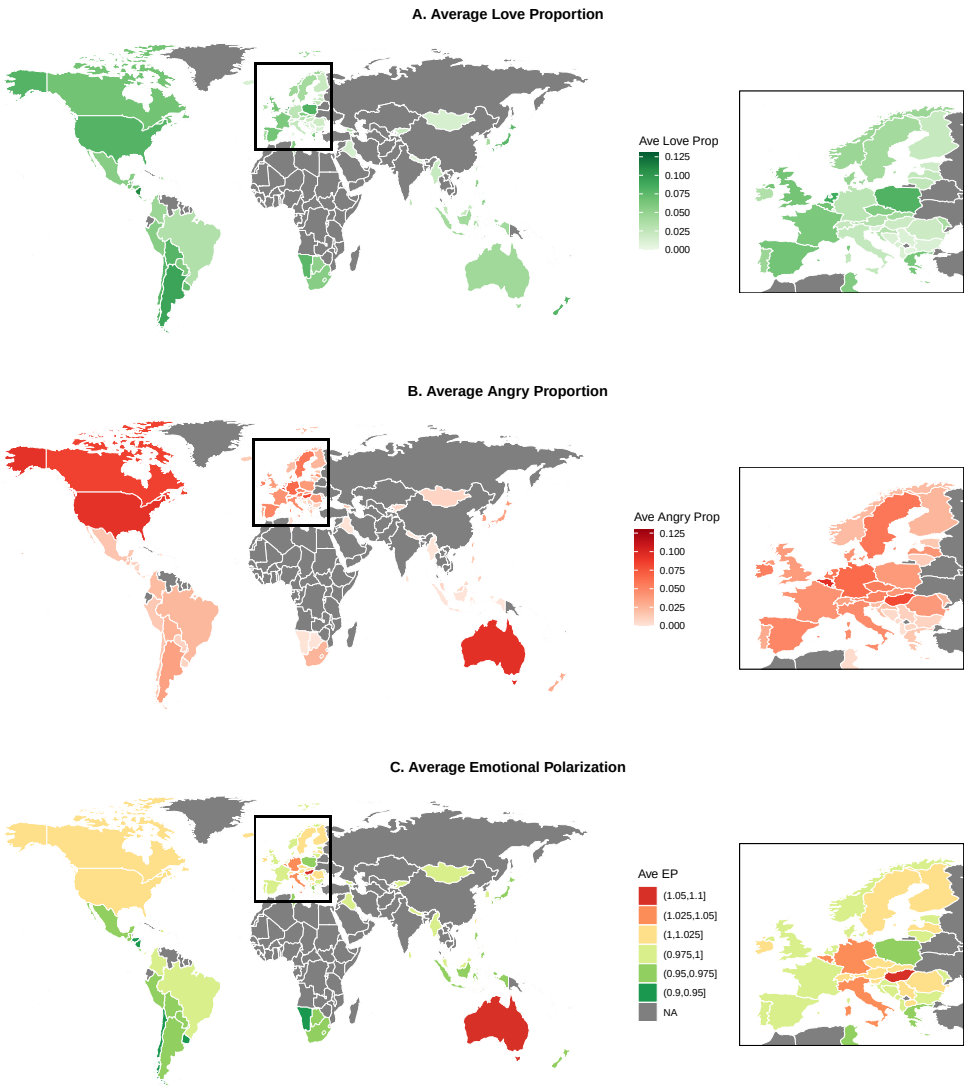

Figure 4. Geographical Distribution of Love, Angry, and Emotional Polarization.

Note. The figure colors countries by the average proportion of Love (panel A), Angry (panel B), and emotional polarization (panel C).

Party-Level Variation

We now turn to the question of whether emotional reactions vary systematically as a function of party characteristics. First, we explore the role of party types, with a specific

focus on right-wing nationalist parties. Second, we divide parties based on their ideological orientation. Finally, we look at whether the proportions of Love and Angry reactions are positively associated with populism.

The data on party family is based on the CMP (Volkens et al., 2020), which classifies parties into ten types: ecological, socialist/other left, social democratic, liberal, Christian democratic, conservative, nationalist, agrarian, ethnic/regional, and special issue. We excluded the category of electoral coalitions from the analysis because it is comprised of parties with diverse sets of policy platforms. In total, we identified the family types of 337 parties in 49 countries. Note that in the CMP, party family does not change overtime.

To measure the ideological positions of parties and coalitions, we first relied on the 2019 Chapel Hill Expert Surveys (CHES; Bakker et al., 2015; Polk et al., 2017).[19] We matched the left-right positions of 244 parties/coalitions in 31 European countries. Although the ideological positions of parties in the CHES can change overtime, we ignore the dynamic role of ideologies in this analysis. Further, to take advantage of the global scope of our data, we also used the Global Party Survey (GPS; Norris, 2019). It is a new, large-scale survey of country experts that provides the measures of parties' economic and social/cultural positions on the left-right dimension beyond Europe. The measure of economic ideology ranges from 0 (Extreme Left/Pro-State) to 10 (Extreme Right/Pro-Market) whereas the social ideology measure ranges from 0 (Liberal) to 10 (Conservative). We obtained the ideology measures of approximately 430 parties in 77 countries from the GPS.[20]

In order to measure the degree to which parties use populist rhetoric, we again relied on the GPS, which also provides a continuous measure of parties' adoption of populist discourse.[21] According to the GPS, populist rhetoric is defined as "a form of discourse or

[19]For the seven parties that are not in the latest version of the survey, we used the values of the previous rounds.

[20]The GPS data does not include Honduras and Sri Lanka.

[21]The question was: "Parties can also be classified by their current use of POPULIST OR PLURALIST rhetoric. POPULIST language typically challenges the legitimacy of established political institutions and emphasizes that the will of the people should prevail. By contrast, PLURALIST rhetoric rejects these ideas, believing that elected leaders should govern, constrained by minority rights, bargaining and compromise, as well as checks and balances on executive power. Where

rhetoric making two core claims, namely that: (i) the only legitimate democratic authority flows directly from the people, and (ii) establishment elites are corrupt, out of touch, and self-serving, betraying the public trust and thwarting the popular will." Merging the GPS with our data, we retrieved the populism scale of 425 parties in 77 countries.[22]

The left panel of Figure 5 summarizes the relationship between party family and the proportions of Love and Angry. Solid points indicate the average proportions of Love and Angry. Reactions are grouped by party family (leftmost = ecologist parties and rightmost = special issue parties). The figure shows that nationalist parties clearly receive the highest proportion of Angry reactions followed by other ideological extreme parties (ecological and and socialist parties). On the other hand, mainstream and regional parties receive far smaller proportions of Angry reactions. While this is largely consistent with previous findings, we find more unexpected patterns when looking at the proportions of Love reactions. Here, it is the extreme leftist parties alone that are outliers, receiving higher proportions of Love reactions relative to both mainstream and nationalist parties.

By contrast, the right panel of Figure 5 shows the relationship between party family and emotional polarization. For 8 out of 10 party families, average emotional polarization is below 1, meaning that Love reactions dominate Angry reactions. By contrast, for agrarian and nationalist parties, emotional polarization is greater than 1 with nationalist parties being a clear outlier. Parties in these two families tend to receive greater proportions of Angry than Love reactions, with nationalist parties standing out as being associated with a disproportionate amount of Angry reactions.

In Figure 6, we move to the estimated relationship between party ideology and the proportions of Love (left panels), Angry (middle panels), and emotional polarization (right panel). Solid lines are estimated by Loess regression with a span of 0.75, and shaded regions indicate 99% confidence intervals. Due to computational limitation, we used a random sample of 20,000 posts to estimate the fitted curves.

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would you place each party on the following scale?" [0-10].

[22] In our data, the party-level correlation between CHES ideology and populism is only 0.35, which is not surprising given that parties in both sides of the ideological spectrum can employ populist rhetoric (Ernst et al., 2017). The descriptive statistics of party positions measures are in Appendix E.

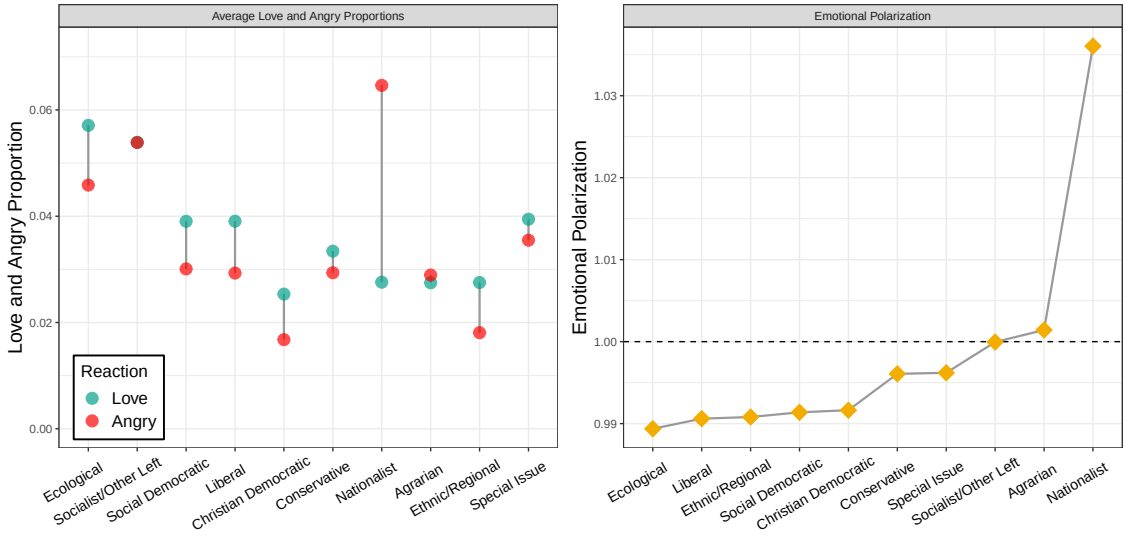

Figure 5. Party Family and Average Love and Angry Proportions.

Note. The left panel shows the relationship between party family and the average proportions of Love and Angry on parties' Facebook pages. The right panel ranks party family by average emotional polarization. The estimates are based on the 1,049,960 posts of 337 parties/coalitions in 49 countries in the Comparative Manifesto Project.

In panel A of Figure 6, the ideology measure is based on the general left-right ideology of European parties in the CHES. The results show a clear "U" curve for the proportion of Angry reactions with a particularly dramatic rise for right-wing parties. The pattern is less clear for the proportion of Love, but again we see more emotional responses for more extreme parties. However, consistent with the party family analysis above, there is a much higher concentration of Love reactions for (extreme) left-wing parties. Reflecting all these patterns, the relationship between ideological extremity and emotional polarization also shows a U shape with right-leaning parties being more clearly different.

In panels B and C of Figure 6, we turn to alternative measures of party ideologies based on the GPS, which includes data from 77 countries. In panel B, we find that pro-market parties tend to receive a relatively high proportion of Love reactions,[23] whereas

[23]Five parties in the data have Economic Ideology = 10.

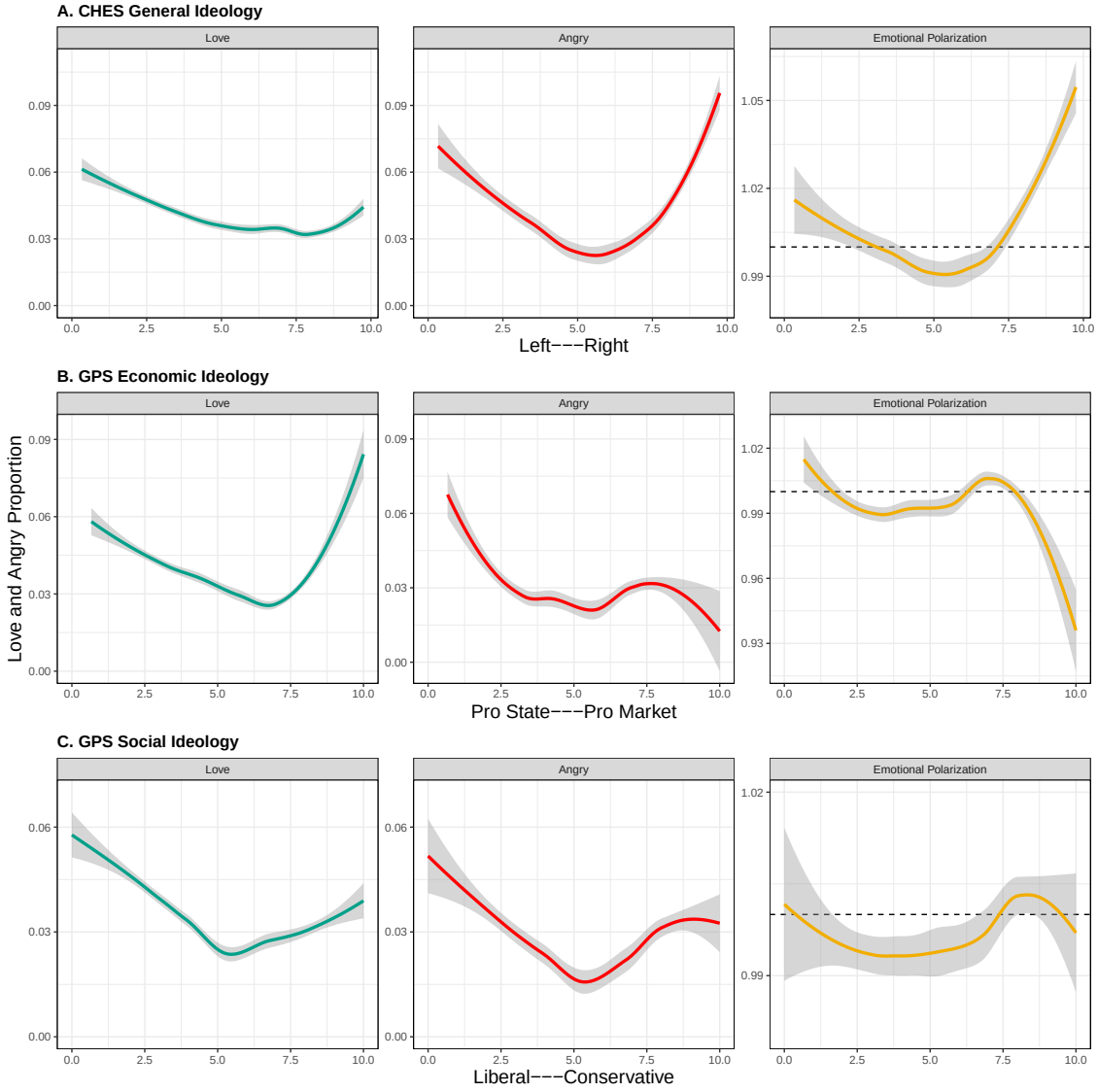

Figure 6. Party Ideology and Love and Angry Proportions.

Note. The figure shows the relationship between left-right ideology and the proportions of Love and Angry and emotional polarization on parties' Facebook posts. Ideology measures are based on general left-right ideology in the CHES (panel A), economic ideology in the GPS (panel B), and social ideology in the GPS (panel C). Solid lines are Loess curves estimated on a random sample of 20,000 posts. Shaded areas indicate 99% confidence intervals.

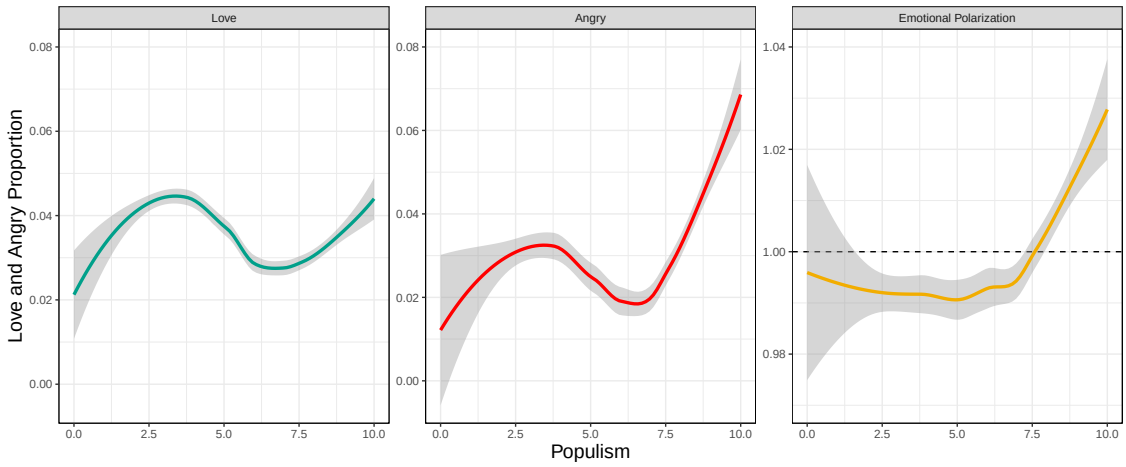

Figure 7. Populist Parties and Love and Angry Proportions.

Note. The figure shows the relationship between populist rhetoric and the proportions of Love and Angry and emotional polarization on parties' Facebook posts. Solid lines are Loess curves estimated on a random sample of 20,000 posts of 425 parties/coalitions in 77 countries. Shaded areas indicate 99% confidence intervals.

these right-leaning parties receive a relatively low proportion of Angry responses. As a result, these parties tend to score low in emotional polarization. In panel C, we again find some suggestive evidence of the U-shaped relationship between cultural ideology and Angry reactions although the relationship is not as dramatic as we found in a subset of European parties. Similarly, there is some pattern that shows that more extreme parties on both sides of the cultural spectrum receive higher proportions of Love reactions than centrist parties. Yet, if we look at the relationship between social ideology and emotional polarization, the fitted Loess curve is nearly flat.

Finally, Figure 7 shows the relationship between populist rhetoric and the proportions of Love (left panel), Angry (middle panel), and emotional polarization (right panel). The x-axis shows the extent to which parties emphasize populism, which ranges from 0 to 10, with higher values indicate more populism. Solid lines are estimated by Loess regression with a span of 0.75 based on a random sample of 20,000 posts to estimate, and shaded regions indicate 99% confidence intervals.

The most obvious pattern is that there is a dramatic increase in the proportion of Angry reactions on posts from more populist parties. In particular, there is a sharp rise beginning for parties roughly about the 7.5 score (constituting 113 parties in our dataset), which contributes to a large spike in emotional polarization among populist parties. This result largely conforms with prior work showing that populist party communications are positively associated with negative emotions.[24]

We describe our ongoing effort to construct a novel cross-national dataset of Facebook posts by political parties and illustrate its potential utility by descriptively analyzing differences in reactions to posts according to party type. We argue that these reactions may serve as a basis for future research into the sources of emotional responses among party supporters cross-nationally. While reactions have been studied for specific elections before, this study represents the most comprehensive dataset yet collected on reactions to social media posts globally.

In addition to basic descriptive statistics, we explore systematic variation in emotional reactions. We show that higher proportions of Angry reactions occur more regularly for ideologically extreme parties, especially for nationalist and populist parties.

For researchers who are interested in investigating country- and party-level variations in Love and Angry reactions, we provide new datasets on the proportions of Love and Angry aggregated at the levels of country-month and party-month. These two datasets allow us to trace overtime changes in emotional responses in greater detail than any other datasets for a large set of democratic countries. We expect that future research can use Love and Angry reactions to answer a wide range of questions in party politics, both as explanatory and outcome variables. For some illustrations of the data, see Appendix G.

Arguably, this research raises at least as many questions as it resolves. To what extent do parties anticipate voter response to posts on social media and in turn modify the

[24]In Appendix F, we replicate our party-level analyses using an alternative way to measure the relative use of Love and Angry and emotional polarization based on the number of page likes (as opposed to the total number of reactions). We find similar results for both operationalizations, though there are small differences. Most notably, trends for populist parties are less extreme when scaled by page likes compared to post reactions.

content of their posts? How do popular responses to posts by political parties influence subsequent posts by the same party? And by competitors? And are parties able to update strategy at a rate that keeps up with user response? The data made available by this article opens the door for serious inquiry along these lines where it was previously closed.

A final important set of questions relates to what motivates individuals to use specific emotional reactions in the first place. Are users being sincere, instrumental (e.g., hoping to provide feedback to political elites), or expressive? This has implications both for understanding online behavior generally and how these reactions can be interpreted by researchers. Similar to current debates in the survey literature, it matters if reactions represent sincere emotional responses, strategic signals aimed at achieving political goals, or are instead expressive responses signaling support for one's group or party (e.g., Prior et al., 2015; Khanna and Sood, 2018; Schaffner and Luks, 2018). Further research on this question is critical if online reactions are to serve as a valid measure of emotional response going forward.

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References

Anspach, N. M. (2017). The new personal influence: How our facebook friends influence the news we read. *Political Communication*, 34(4):590–606.

Bakker, R., De Vries, C., Edwards, E., Hooghe, L., Jolly, S., Marks, G., Polk, J., Rovny, J., Steenbergen, M., and Vachudova, M. A. (2015). Measuring party positions in europe: The chapel hill expert survey trend file, 1999–2010. *Party Politics*, 21(1):143–152.

Barberá, P. (2015). Birds of the same feather tweet together: Bayesian ideal point estimation using twitter data. *Political Analysis*, 23(1):76–91.

Blassnig, S. and Wirz, D. S. (2019). Populist and popular: An experiment on the drivers of user reactions to populist posts on facebook. *Social Media + Society*, 5(4):1–12.

Bond, R. and Messing, S. (2015). Quantifying social media's political space: Estimating ideology from publicly revealed preferences on facebook. *American Political Science Review*, 109(1):62–78.

Brader, T. (2006). *Campaigning for hearts and minds: How emotional appeals in political ads work*. University of Chicago Press, Chicago, IL.

Brader, T., Valentino, N. A., and Suhay, E. (2008). What triggers public opposition to immigration? anxiety, group cues, and immigration threat. *American Journal of Political Science*, 52(4):959–978.

Bucher, T. (2012). Want to be on the top? algorithmic power and the threat of invisibility on facebook. *New Media & Society*, 14(7):1164–1180.

Crabtree, C., Golder, M., Gschwend, T., and Indriđason, I. H. (2020). It is not only what you say, it is also how you say it: The strategic use of campaign sentiment. *The Journal of Politics*, 82(3):1044–1060.

CrowdTangle Team (2020). CrowdTangle. Facebook, Menlo Park, California, United States. List ID: `GlobalPartyList`.

Eberl, J. M., Tolochko, P., Jost, P., Heidenreich, T., and Boomgaarden, H. G. (2020). What's in a post? how sentiment and issue salience affect users' emotional reactions on facebook. *Journal of Information Technology & Politics*, 17(1):48–65.

Ernst, N., Engesser, S., Büchel, F., Blassnig, S., and Esser, F. (2017). Extreme parties and populism: An analysis of facebook and twitter across six countries. *Information, Communication & Society*, 20(9):1347–1364.

Ford, B. Q., Feinberg, M., Lam, P., Mauss, I. B., and John, O. P. (2019). Using reappraisal to regulate negative emotion after the 2016 us presidential election: Does emotion regulation trump political action? *Journal of Personality and Social Psychology*, 117(5):998–1015.

Gerlitz, C. and Helmond, A. (2013). The like economy: Social buttons and the data-intensive web. *New Media & Society*, 15(8):1348–1365.

Gibson, R. K. (2015). Party change, social media and the rise of 'citizen-initiated' campaigning. *Party Politics*, 21(2):183–197.

Heiss, R. and Matthes, J. (2020). Stuck in a nativist spiral: Content, selection, and effects of right-wing populists' communication on facebook. *Political Communication*, 37(3):303–328.

Hoewe, J. and Parrott, S. (2019). The power of anger: How emotions predict information seeking and sharing after a presidential election. *Atlantic Journal of Communication*, 27(4):272–283.

Jackson, S. J., Bailey, M., and Welles, B. F. (2020). *#HashtagActivism: Networks of Race and Gender Justice*. MIT Press, Cambridge, MA.

Jacobs, K., Sandberg, L., and Spierings, N. (2020). Twitter and facebook: Populists' double-barreled gun? *New Media & Society*, 22(4):611–633.

Jennings, R. (2019). Why selfie lines are crucial to elizabeth warren's campaign: Selfie lines are officially a major part of the 2020 democratic primaries.

Jones, P. E., Hoffman, L. H., and Young, D. G. (2013). Online emotional appeals and political participation: The effect of candidate affect on mass behavior. *New Media & Society*, 15(7):1132–1150.

Jost, P., Maurer, M., and Hassler, J. (2020). Populism fuels love and anger: The impact of message features on users' reactions on facebook. *International Journal of Communication*, 14:2081–2102.

Jung, J. H. (2020). The mobilizing effect of parties' moral rhetoric. *American Journal of Political Science*, 64(2):341–355.

Khanna, K. and Sood, G. (2018). Motivated responding in studies of factual learning. *Political Behavior*, 40(1):79–101.

Kosmidis, S., Hobolt, S. B., Molloy, E., and Whitefield, S. (2019). Party competition and emotive rhetoric. *Comparative Political Studies*, 52(6):811–837.

Lucas, C., Nielsen, R. A., Roberts, M. E., Stewart, B. M., Storer, A., and Tingley, D. (2015). Computer-assisted text analysis for comparative politics. *Political Analysis*, 23(2):254–277.

Marcus, G. E., Neuman, W. R., and MacKuen, M. (2000). *Affective intelligence and political judgment*. University of Chicago Press, Chicago, IL.

Marshall, M. G. and Gurr, T. R. (2020). Polity5 Annual Time-Series, 1946-2018. The Polity V Project. Center for Systemic Peace. https://www.systemicpeace.org.

Marx, P. (2020). Anti-elite politics and emotional reactions to socio-economic problems: Experimental evidence on 'pocketbook anger' from france, germany, and the united states. *The British Journal of Sociology*, 71(4):608–624.

Matamoros Fernandez, A. (2018). Inciting anger through facebook reactions in belgium: The use of emoji and related vernacular expressions in racist discourse. *First Monday*, 23(9):1–20.

Messing, S. and Westwood, S. J. (2014). Selective exposure in the age of social media: Endorsements trump partisan source affiliation when selecting news online. *Communication Research*, 41(8):1042–1063.

Norris, P. (2019). The Global Party Survey, 2019. V1.0. https://www.GlobalPartySurvey.org.

Nulty, P., Theocharis, Y., Popa, S. A., Parnet, O., and Benoit, K. (2016). Social media and political communication in the 2014 elections to the european parliament. *Electoral Studies*, 44:429–444.

Polk, J., Rovny, J., Bakker, R., Edwards, E., Hooghe, L., Jolly, S., Koedam, J., Kostelka, F., Marks, G., Schumacher, G., Steenbergen, M., Vachudova, M. A., and Zilovic, M. (2017). Explaining the salience of anti-elitism and reducing political corruption for political parties in europe with the 2014 chapel hill expert survey data. *Research & Politics*, 4(1):1–9.

Prior, M., Sood, G., Khanna, K., et al. (2015). You cannot be serious: The impact of accuracy incentives on partisan bias in reports of economic perceptions. *Quarterly Journal of Political Science*, 10(4):489–518.

Roche, M. J. and Jacobson, N. C. (2019). Elections have consequences for student mental health: an accidental daily diary study. *Psychological Reports*, 122(2):451–464.

Schaffner, B. F. and Luks, S. (2018). Misinformation or expressive responding? what an inauguration crowd can tell us about the source of political misinformation in surveys. *Public Opinion Quarterly*, 82(1):135–147.

Scheller, S. (2019). The strategic use of fear appeals in political communication. *Political Communication*, 36(4):586–608.

Valentim, V. and Widmann, T. (2020). Does radical-right success make the political debate more negative? *Available at SSRN 3590343*.

Valentino, N. A., Brader, T., Groenendyk, E. W., Gregorowicz, K., and Hutchings, V. L. (2011). Election night's alright for fighting: The role of emotions in political participation. *The Journal of Politics*, 73(1):156–170.

Vasilopoulos, P., Marcus, G. E., Valentino, N. A., and Foucault, M. (2019). Fear, anger, and voting for the far right: Evidence from the november 13, 2015 paris terror attacks. *Political Psychology*, 40(4):679–704.

Volkens, A., Burst, T., Krause, W., Lehmann, P., Matthieß, T., Merz, N., Regel, S., Weßels, B., and Zehnter, L. (2020). The Manifesto Data Collection. Manifesto Project (MRG/CMP/MARPOR). Version 2020a. Berlin: Wissenschaftszentrum Berlin für Sozialforschung (WZB). https://doi.org/10.25522/manifesto.mpds.2020a.

Webster, S. W. (2020). *American Rage: How Anger Shapes Our Politics*. Cambridge University Press, New York.

Widmann, T. (2019). How emotional are populists really? factors explaining emotional appeals in the communication of political parties. *Factors Explaining Emotional Appeals in the Communication of Political Parties (December 1, 2019)*.

Wirz, D. S., Wettstein, M., Schulz, A., Müller, P., Schemer, C., Ernst, N., Esser, F., and Wirth, W. (2018). The effects of right-wing populist communication on emotions and cognitions toward immigrants. *The International Journal of Press/Politics*, 23(4):496–516.

Appendix

A. Potential Party Accounts Excluded from the Analysis

Table A1: Party Accounts with Low Engagement.

Country	Party	URL
A. Excluded:		
Argentina	Federal Commitment	https://www.facebook.com/alianzacompromisofederal/
Kyrgyzstan	Butun Kyrgyzstan	https://www.facebook.com/256100474539110/
Kyrgyzstan	Butun Kyrgyzstan–Emgek	https://www.facebook.com/butunkyrgyzstan2020/
Kyrgyzstan	Emgek	https://www.facebook.com/emgek/
Lesotho	Basotho National Party	https://www.facebook.com/686420584872937/
Lesotho	Popular Front for Democracy	https://www.facebook.com/1466151693448159/
Namibia	Namibian Economic Freedom Fighters	https://www.facebook.com/624127884759801/
Namibia	United Democratic Front	https://www.facebook.com/1472681582998631/
Nepal	Communist Party of Nepal (Maoist Centre)	https://www.facebook.com/cpnmoaistnepal/
Nepal	National People's Party	https://www.facebook.com/129627357696093/
Nicaragua	Nicaraguan Liberal Alliance	https://www.facebook.com/120621408625448/
Nicaragua	YATAMA	https://www.facebook.com/YatamaOch8/
Philippines	Nationalist People's Coalition	https://www.facebook.com/NPCPH/
Sri Lanka	Democratic National Movement	https://www.facebook.com/102616404505855/
B. Not Excluded:		
Armenia	Mission Party	https://www.facebook.com/arakelutyun/
Bosnia Herzegovina	Party of Democratic Activity	https://www.facebook.com/strankaasdabih/
Dominican Rep.	National Unity Party	https://www.facebook.com/PUNRD/
Indonesia	Golkar	https://www.facebook.com/DPPPGolkar/
Iraq	Conquest Alliance	https://www.facebook.com/1662337954016541/
Israel	National Statesman-Like Movement	https://www.facebook.com/TelemParty/
Kyrgyzstan	Social Democratic Party	https://www.facebook.com/sdpkkg/
Latvia	Growth	https://www.facebook.com/PartijaIzaugsme/
Nicaragua	Alliance for the Republic	https://www.facebook.com/partido.apre/
North Macedonia	New Social Democratic Party	https://www.facebook.com/490704661117070/
Peru	Peru Libre	https://www.facebook.com/prensa.appu/
Philippines	National Unity Party	https://www.facebook.com/NationalUnityParty/
Philippines	Nationalist Party	https://www.facebook.com/nacionalista.p/
Philippines	United Nationalist Alliance	https://www.facebook.com/PartidoUNA/

After downloading the data, we checked the level of engagement on parties' Facebook pages in terms of total # of posts, comments, reactions, Love, and Angry. Table A1 summarizes party accounts that showed low engagement in four out of the five indices

(lower than 5% quantile in each). After carefully reading posts on their pages, we decided to exclude 14 party accounts in panel A but keep party accounts in panel B.

B. The Number of Party Accounts and Posts by Country

Table B1: The Number of Accounts and Posts by Country.

Country	# Pages (# Posts)	Country	# Pages (# Posts)	Country	# Pages (# Posts)
Albania	4 (14954)	Guatemala	16 (12849)	New Zealand	4 (9883)
Argentina	14 (21698)	Honduras	5 (9483)	Nicaragua	5 (2279)
Armenia	9 (12978)	Hungary	8 (41960)	North Macedonia	10 (28913)
Australia	7 (14101)	Iceland	9 (13696)	Norway	8 (14938)
Austria	5 (18826)	Indonesia	9 (36141)	Panama	5 (7351)
Belgium	13 (29284)	Iraq	13 (70368)	Paraguay	7 (7572)
Bolivia	6 (5387)	Ireland	10 (18203)	Peru	14 (13639)
Bosnia Herzegovina	14 (31282)	Israel	33 (23457)	Philippines	14 (14558)
Botswana	4 (4680)	Italy	7 (148697)	Poland	16 (42334)
Brazil	22 (104002)	Jamaica	2 (2686)	Portugal	7 (35355)
Bulgaria	9 (27391)	Japan	6 (8682)	Romania	6 (23999)
Canada	6 (14638)	Kyrgyzstan	7 (3681)	Serbia	21 (39223)
Chile	15 (30436)	Latvia	14 (23671)	Slovakia	15 (26945)
Colombia	12 (37538)	Lebanon	12 (244307)	Slovenia	9 (23259)
Costa Rica	7 (10783)	Lesotho	5 (3704)	South Africa	6 (22273)
Croatia	13 (25311)	Lithuania	7 (7939)	South Korea	4 (14971)
Cyprus	8 (16945)	Luxembourg	7 (9292)	Spain	21 (82719)
Czech Rep.	9 (35148)	Malaysia	17 (155525)	Sri Lanka	12 (22536)
Denmark	11 (18508)	Malta	2 (6742)	Sweden	8 (17922)
Dominican Rep.	12 (16400)	Mexico	8 (44815)	Switzerland	15 (15707)
El Salvador	6 (22144)	Moldova	8 (9788)	Taiwan	6 (9805)
Estonia	10 (13837)	Mongolia	5 (6223)	Tunisia	19 (45946)
Finland	8 (22444)	Montenegro	14 (24369)	United Kingdom	6 (20900)
France	8 (24903)	Myanmar	4 (10859)	United States	2 (7417)
Georgia	7 (12007)	Namibia	5 (1388)	Uruguay	7 (13160)
Germany	7 (18046)	Nepal	2 (9598)		
Greece	6 (16505)	Netherlands	12 (14175)	TOTAL	746 (2146078)

C. Average Number of Reactions and Like Proportion by Country per Post

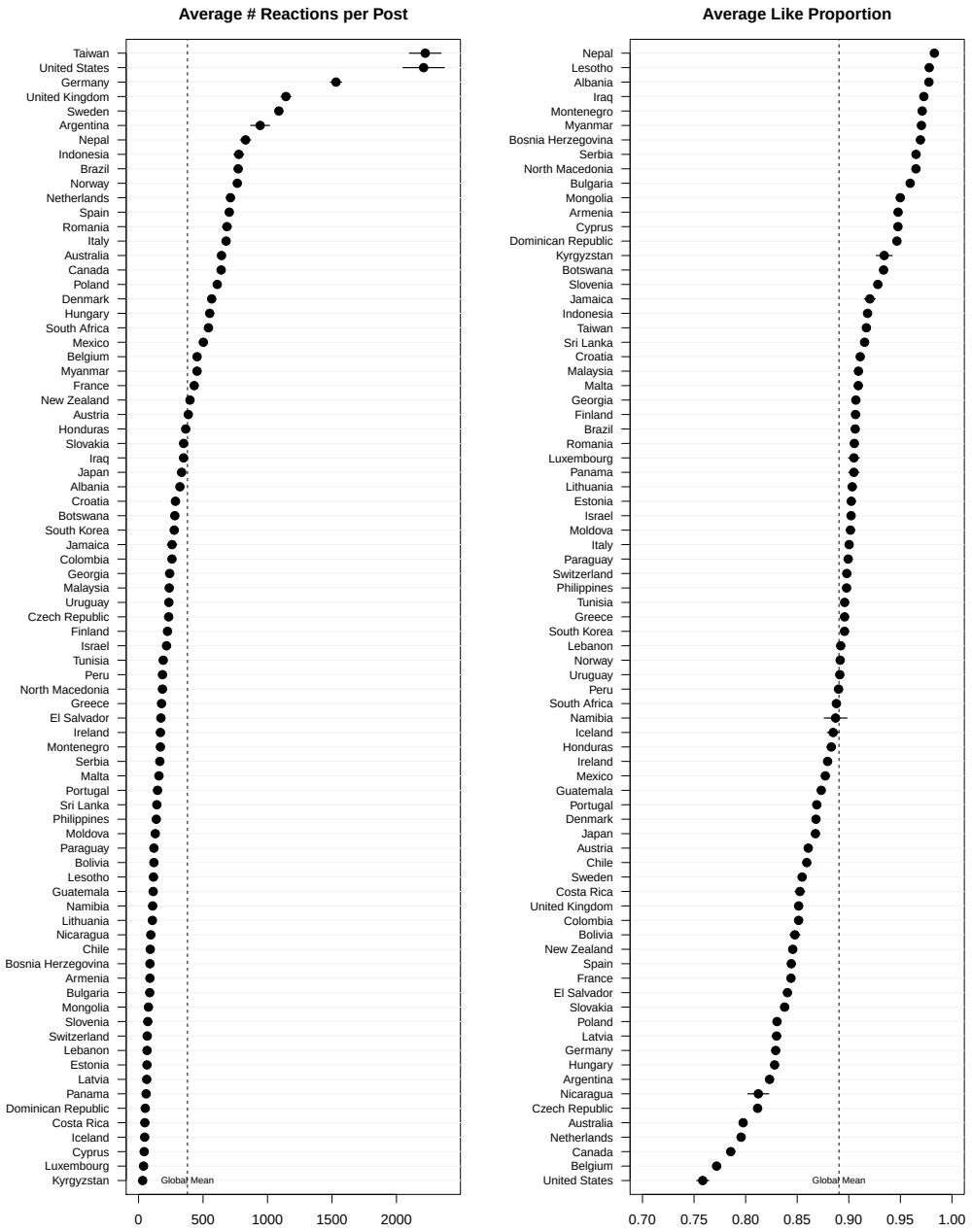

Figure C1. Democratic Countries Ranked by the Number of Reactions and Like Proportion.

Note. The figure ranks democratic countries by the average total number of reactions per post and average Like proportion. Horizontal bars indicate 99% confidence intervals.

What is the relationship between the number of reactions that posts receive and the diversity of these reactions? To answer this question, we calculate the fractionalization of reactions in each post using a fractionalization index:

$$1 - \sum_{r=1}^{n} p_r^2 \tag{C1}$$

where p_r is a proportion of each reaction (Like, Love, Angry, Wow, Haha, and Sad) in the post. Then, we split posts in our data into ten groups by the quantile of the logged number of their total reactions. In Figure C2, we show the relationship between the number of total reactions and the fractionalization of reactions by post. Posts with a greater number of reactions tend to receive a more diverse set of reactions.

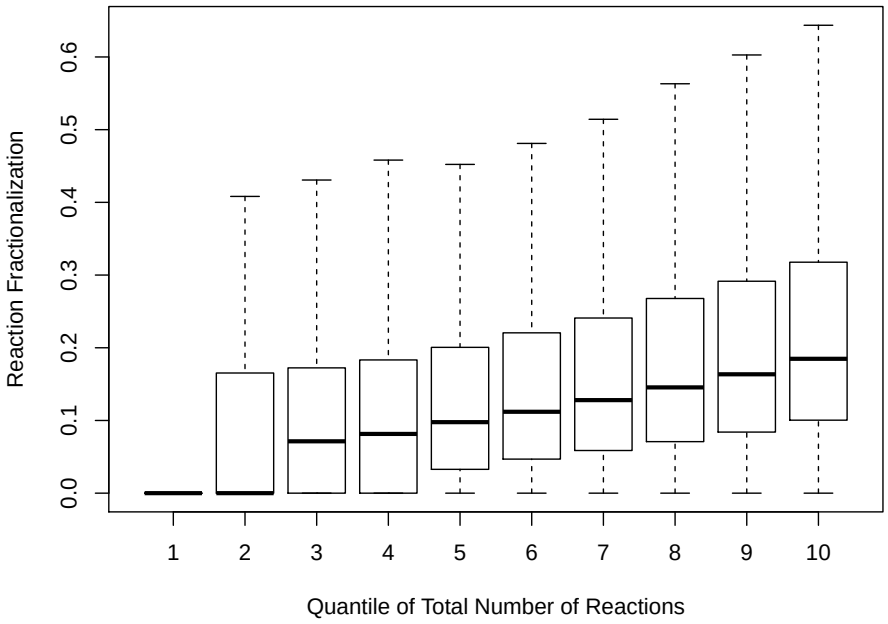

Figure C2. The Number of Reactions and Reaction Fractionalization.

Note. The figure shows the relationship between the number of total reactions and the fractionalization of reactions.

D. Correlations between Love and Angry Proportions by Country

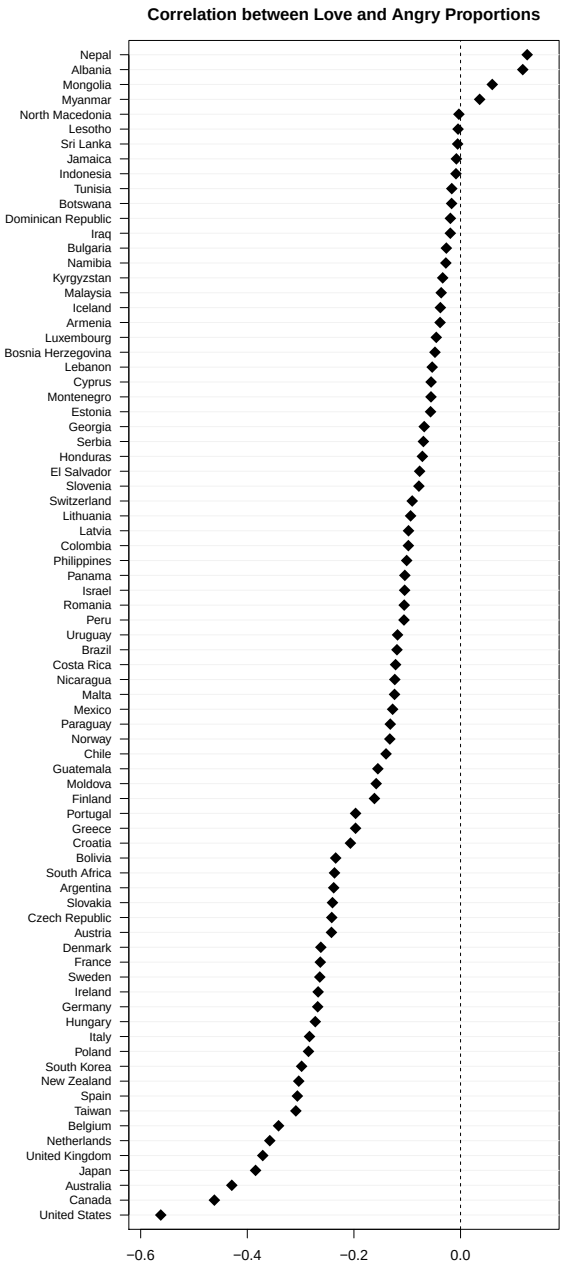

Figure D1. Correlation between Love and Angry Proportions by Country.

Note. The figure shows the correlation between love proportion and angry proportion by country.

E. The Descriptive Statistics of Party-Level Measures

Table E1: Parties in the CMP.

Family	N
Ecological	20
Socialist/Other Left	36
Social Democratic	60
Liberal	51
Christian Democratic	26
Conservative	51
Nationalist	30
Agrarian	11
Ethnic/Regional	37
Special Issue	15

Table E2: Parties in the CHES and the GPS.

						Correlations		
	N	Mean	SD	Min	Max	(1)	(2)	(3)	(4)
(1) CHES General Ideology	244	5.21	2.29	0.33	9.75	1			
(2) GPS Economic Ideology	424	5.15	2.26	0.67	10	0.78	1		
(3) GPS Social Ideology	429	5.37	2.69	0	10	0.69	0.45	1	
(4) GPS Populism	425	5.39	2.41	0	10	0.35	0.02	0.53	1

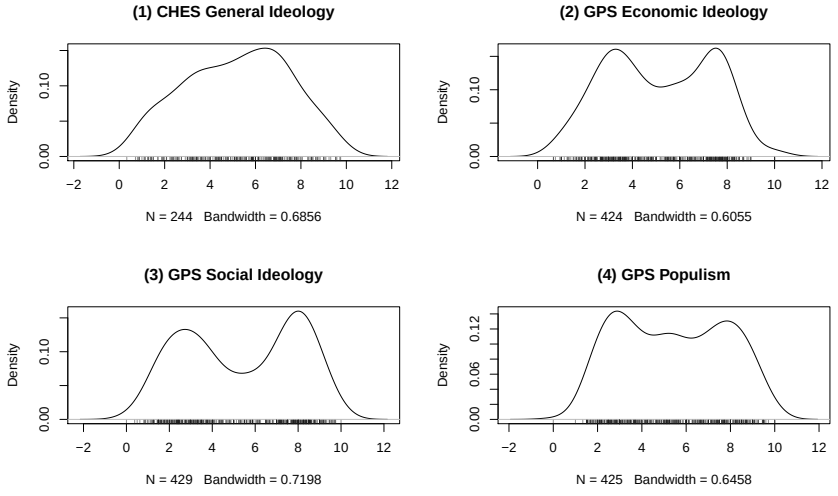

Figure E1. The Distributions of the CHES and GPS Measures.

F. Alternative Operationalization of Love and Angry Proportions

In order to show that some of our descriptive results are robust to different ways to understand the proportions of Love and Angry reactions, we test one alternative measure: the raw counts of Love and Angry divided by the number of page likes at the time of posting (which is different from the number of Likes that a post receives).[A1] We multiply this number by 100 so that it is easily interpretable.

In Figures F1 and F2,[A2] we replicate the results of Figures 5, 6, and 7 in the main text. Overall, we find that our results are similar regardless of our denominator choices, either the total number of reactions or the number of page likes.

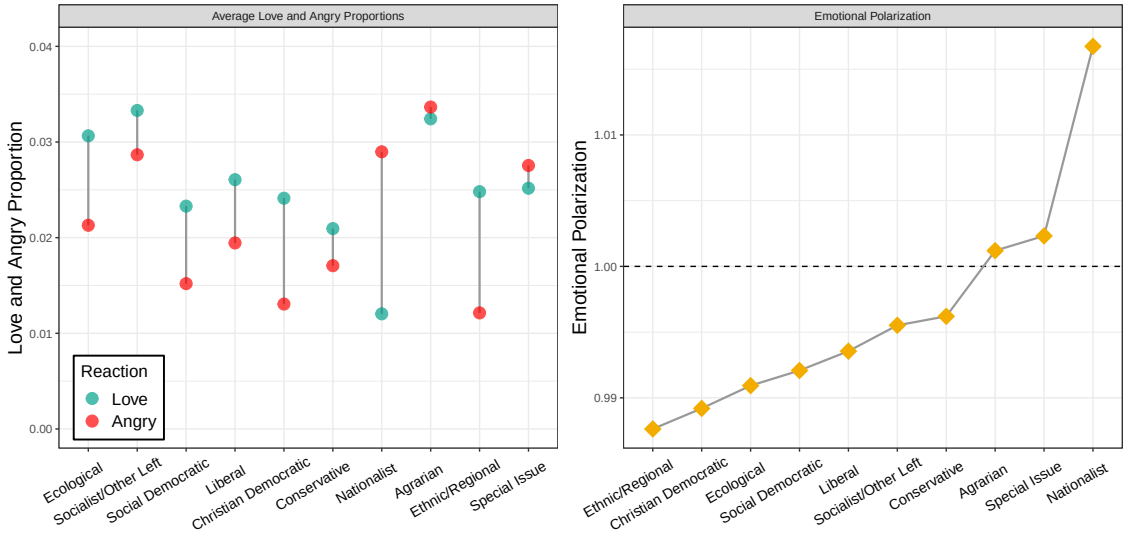

Figure F1. Party Family and Love and Angry Proportions II.

Note. The left panel shows the relationship between party family and the average proportions of Love and Angry on parties' Facebook pages. The right panel ranks party family by average emotional polarization.

Nevertheless, there are several notable differences between these alternative results and those reported in the main text. First, in the left panel of Figure F1, Agrarian parties

[A1] We find that this variable is missing for 402,366 observations in our data. Hence, the total number of posts analyzed in this section becomes smaller than that in the main text.

[A2] The y-axes are different in panels A to D.

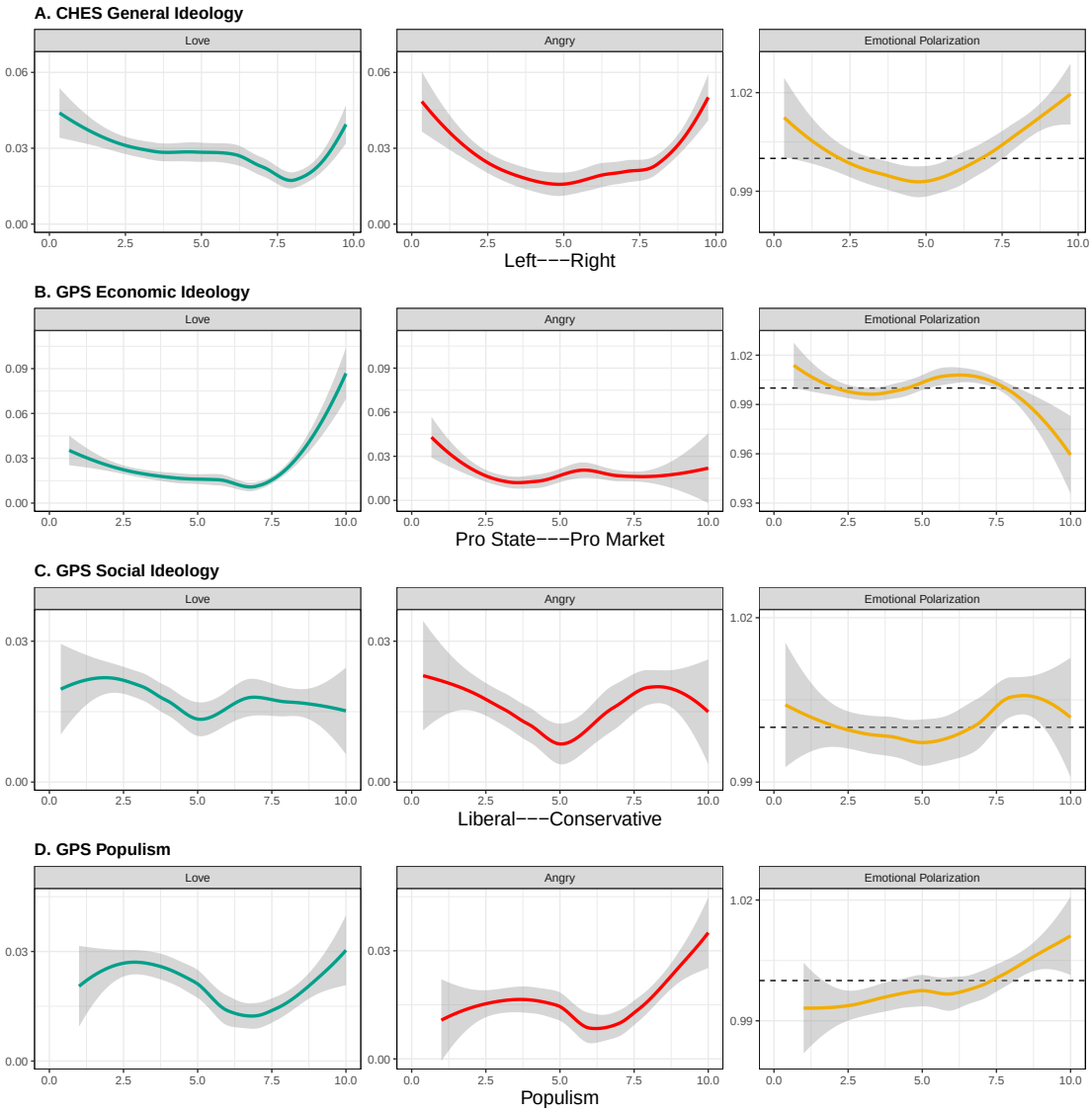

Figure F2. Party Ideology and Love and Angry Proportions II.

Note. The figure shows the relationship between left-right ideology and populism and the proportions of Love and Angry. Solid lines are Loess curves estimated on a random sample of 20,000 posts. Shaded areas indicate 99% confidence intervals.

score relative high on both proportions of Love and Angry. This is because these parties tend to have smaller but more active follower bases than other parties. Second, in both panels of Figure F1, we see that the relationship between Love and Angry reactions is flipped

among Special Issue parties. But we find that this is likely due to a statistical artifact of using the mean values of Love and Angry proportions. Third, the emotional polarization of Nationalist parties' posts becomes less dramatic than the one reported in the right panel of Figure 5 in the main text. Finally, in the bottom right panel of Figure F2, we see that the relationship between populist parties and emotional polarization also becomes less salient than the one presented in the right panel of Figure 7.

G. The Monthly Trends of Average Love and Angry Proportions in 10 Countries

Figure G1 illustrates our country-month and party-month data on Love and Angry reactions for 10 countries in which these two reactions are extensively used. Red and blue solid lines indicate the monthly average proportions of love and angry at the country level. Gray lines show the monthly average proportions of love and angry by party. Vertical dashed lines indicate the months of lower house elections.

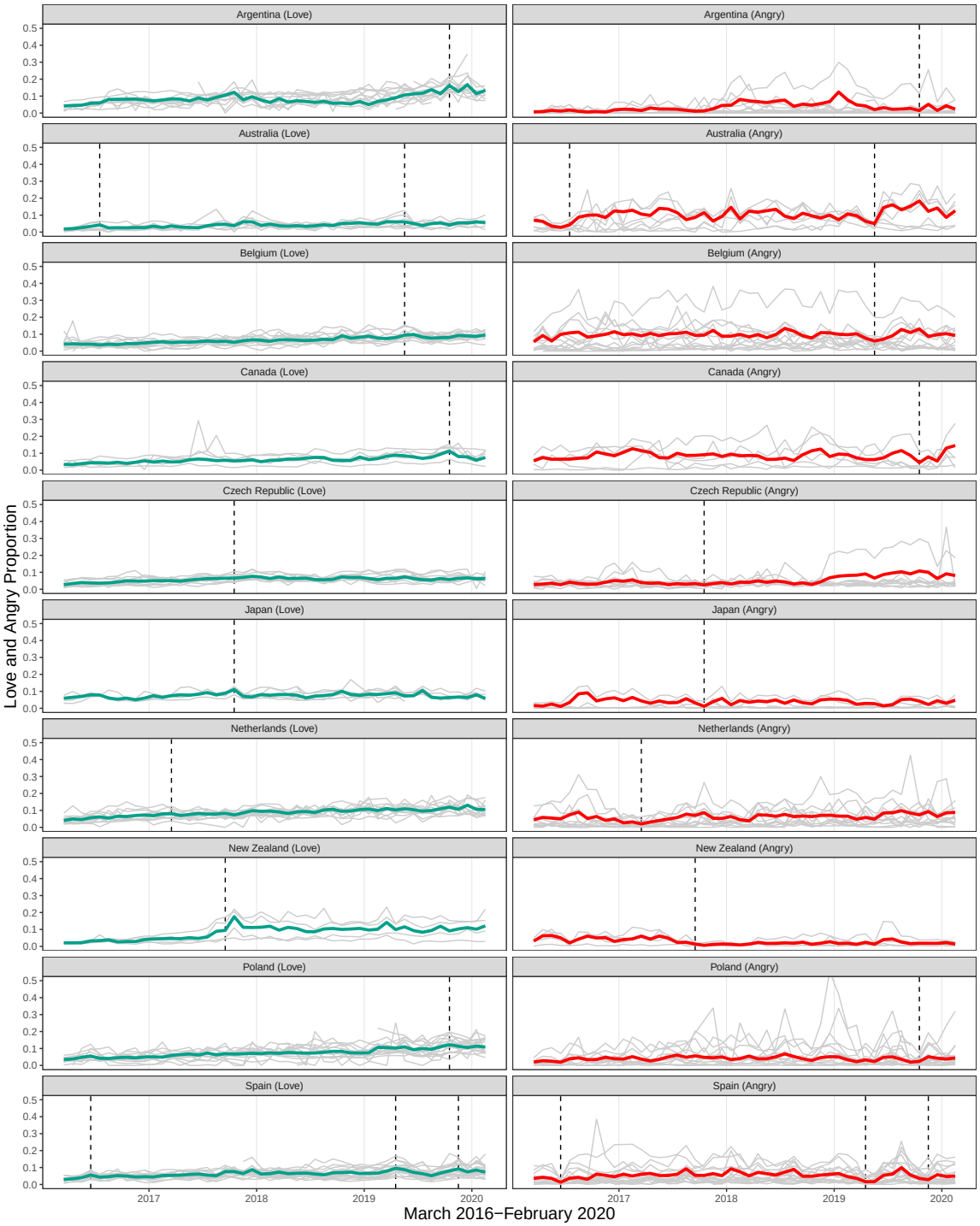

Figure G1. Monthly Trends (Party and Country Averages).